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| LAWRENCE CHO C/O PORTFOLIOIP P. O. BOX 52050 MINNEAPOLIS, MN 55402 | | | EXAMINER RIDER, JUSTIN W | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/811,208

Applicant(s)

PS ET AL.

Examiner

Justin W. Rider

Art Unit

2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is responsive to communications: Application filed 26 March 2004. Claims 1-32 are pending.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-7, 22-32 rejected under 35 U.S.C. 102(b) as being anticipated by **Strauss et al.** (US 2002/0116186 A1) referred to as **Strauss** hereinafter.

Claims 1, 22 and 27: **Strauss** discloses a speech signal processing method, comprising determining a presence of impulsive distortion (e.g. spikes above a certain average level, also considered noise by the Examiner) in the speech data from root mean square (RMS) (p. 14, paragraph [0142], '*...when the root mean squared energy of S_m (RMS) falls below -36dBm indicating no tone signals.*' Also, Abstract, '*detect whether a threshold amount of energy is present...*') and zero crossing rate (ZCR) (Fig. 14D; p. 15, paragraph [0154]) values of the speech data.

Claims 2, 23 and 30: **Strauss** discloses a speech signal processing method as per claims 1, 22 and 27 above, further comprising framing the speech data (Fig. 17 shows where the speech data processing is taking place on a frame of data, it is therefore inherently recited that the input speech data is framed.).

Claims 3, 24 and 28: **Strauss** discloses a speech signal processing method as per claims 1, 22 and 29 above, wherein determining the presence of impulsive distortion comprises identifying a low ZCR (p. 15, paragraph [0154], '*Speech tends to have a high number of zero crossings.*' [inversely, noisy or distorted impulses will have a low ZCR.]) value and a high RMS (p. 14, paragraph [0142], '*...when the root mean squared energy of Sin (RMS) falls below -36dBm indicating no tone signals.*') value (p. 3, paragraph [0050] recites wherein noise and high energy flags are set based on certain threshold values of RMS energy and zero crossing rates.).

Claim 4, 25 and 29: **Strauss** discloses a speech signal processing method as per claims 1, 22 and 29 above, wherein determining the presence of impulsive distortion comprises identifying a high ZCR (p. 15, paragraph [0154], '*Speech tends to have a high number of zero crossings.*') value and a high RMS (p. 14, paragraph [0142], '*...when the root mean squared energy of Sin (RMS) falls below -36dBm indicating no tone signals.*') value (p. 3, paragraph [0050] recites wherein noise and high energy flags are set based on certain threshold values of RMS energy and zero crossing rates.).

Claims 5 and 6: **Strauss** discloses a speech signal processing method as per claim 2, wherein the RMS value is computed for a frame of the speech data and indicates a strength of a speech signal in the frame (p. 14, paragraph [0142], '*...when the root mean squared energy of Sin (RMS) falls below -36dBm indicating no tone signals.*') and the ZCR value is computed for a frame of the speech data and indicates a rate at which a speech signal switches across its mean value in the frame (p. 15, paragraph [0154]).

Claims 7, 26 and 31: **Strauss** discloses a speech signal processing method as per claims 1 and 22 above, further comprising determining the presence of impulsive distortion in the speech

data from a sample energy value of a speech sample from the speech data (Abstract, '*detect whether a threshold amount of energy is present to determine whether an energy flag should be set, and detect whether instantaneous energy is present to determine whether an instantaneous energy flag should be set. Utilizing a combination of the noise, zero crossing, energy, and instantaneous energy flags the integrated voice activation detector determines whether voice is present.*').

Claim 32: **Strauss** discloses a speech signal processing method as per claim 31 above, wherein the spike detection unit determines a presence of impulsive distortion in the speech sample in response to the sample energy value and the sample energy values of speech samples neighboring the speech sample (It is inherent that since the definition of an impulsive distortion is an unwanted 'spike' in an input signal that there would necessarily be a large energy disparity between the affected samples and the surrounding 'neighbor' samples; this difference would noticeably show signs of impulsive distortion.).

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

5. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an

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international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

6. Claims 9-10 are rejected under 35 U.S.C. 102(e) as being anticipated by **Beerends et al.** (US 2004/0078197 A1) referred to as **Beerends** hereinafter.

Claim 9: **Beerends** discloses a method for processing speech data, comprising the following steps:

- i. performing speech quality measurement on the speech data (Abstract, '*measurements methods and devices for predicting perceptual quality of speech signals...* '); and
- ii. determining a presence of impulsive distortion in the speech data p. 1, paragraph [0004], '*It is this behaviour of the reciprocal value of such a power related parameter, that can be used to adapt the distortion calculation in such a manner that a much better prediction of the subjective quality of systems under test is possible.* ').

Claim 10: **Beerends** discloses a method for processing speech data, further comprising:

- i. performing level alignment and filtering (p. 2, paragraph [0028], '*the pre-processing including power level scaling,* ');
performing time alignment (p. 2, paragraph [0028], '*...and time alignment operations.* ');
performing auditory processing (p. 2, paragraph [0028], '*The further processing step implies mapping of the (degraded) output signal $Y(t)$ and the reference signal $X(t)$ on representation signals $R(Y)$ and $R(X)$ according to a psycho-physical perception model of the human auditory system.* ');

performing disturbance processing (p. 2, paragraph [0028], *'During the combined signal processing step a differential or disturbance signal D is determined by the differentiating means 15 from said representation signals, '*); and

performing cognitive modeling (p. 2, paragraph [0028], *'which is then processed by modeling means 16 in accordance with a cognitive model, '*).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 11-12 and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Beerends** in view of **Strauss**.

Claim 11: **Beerends** discloses a method for signal quality enhancement as per claim 9 above, however failing to, but **Strauss** does disclose determining the presence of impulsive distortion in the speech data from a sample energy value of a speech sample from the speech data (Abstract, *'detect whether a threshold amount of energy is present to determine whether an energy flag should be set, and detect whether instantaneous energy is present to determine whether an instantaneous energy flag should be set. Utilizing a combination of the noise, zero crossing, energy, and instantaneous energy flags the integrated voice activation detector determines whether voice is present. '*).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Strauss** in the methods of **Beerends** because it provides an advantageous recitation of determining the presence of instantaneous signal distortion and taking appropriate measures to eliminate such distortions that can severely degrade signal quality.

Claim 12: **Beerends** discloses a method for signal quality enhancement as per claim 11 above, however failing to, but **Strauss** does disclose a speech signal processing method as per claim 31 above, wherein the spike detection unit determines a presence of impulsive distortion in the speech sample in response to the sample energy value and the sample energy values of speech samples neighboring the speech sample (It is inherent that since the definition of an impulsive distortion is an unwanted 'spike' in an input signal that there would necessarily be a large energy disparity between the affected samples and the surrounding 'neighbor' samples; this difference would noticeably show signs of impulsive distortion.) to determine whether there is a difference greater than a predetermined threshold value (p. 10, paragraph [0106]).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Strauss** in the methods of **Beerends** because of the same reasons outlined in the rejection of claim 11 above.

Claims 16-21: Claims 16-21 are similar in scope and content to that of claims 1-6, respectively and so therefore are rejected under the same rationale.

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Beerends** in view of **Strauss** and in further view of **deVries** (US Patent No. 6,289,309) referred to as **deVries** hereinafter.

Claim 13: **Beerends**, in view of **Strauss** discloses a speech signal processing method as per claim 11 above, however failing to, but **deVries** does, specifically disclose using Teager energy operations to determine signal sample energy (col. 7, line 65 - col. 8, line 5).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **deVries** in the method of **Beerends** and **Strauss** because it provides an effective way of windowing and framing an input sound signal in order to enhance speech by means of differentiating between speech and noise (Abstract; col. 1, Background). Teager energy operations were originally derived as a mode to demonstrate the importance of energy characteristics for analysis and modeling of speech signals on a non-linear basis. The Teager energy operations are historically used to implement the idea of the importance of energy utilization in speech signal processing. It has proven particularly useful in stress (e.g. spikes and impulsive distortions) analysis in speech signals.

10. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Beerends**.

Claim 14: **Beerends** discloses a method as per claim 9 above wherein RMS values of samples and frames are compared against threshold values in order to determine the presence of impulsive distortion or spikes in an input signal. However, **Beerends** fails to disclose wherein every other frame is compared in order to make a distortion determination. The Examiner is asserting that such a step would be a suitably obvious choice of design for determining energy

levels for a given frame. The use of overlapping frames is a use that is commonly known to those possessing ordinary skill in the art, and so the measurement of every other frame would be a known obvious step in order to avoid redundant overlapping measurements and to obtain results from totally independent frames.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to take energy values from every other frame (e.g. $k-4$, $k-2$, k , $k+2$ and $k+4$) so as to take accurate independent energy measurements and to also avoid redundant information, which would adversely affect the outcome.

Claim 15: Claim 15 is similar in scope and content to that of claim 14 above and so therefore is rejected under the same rationale.

Conclusion

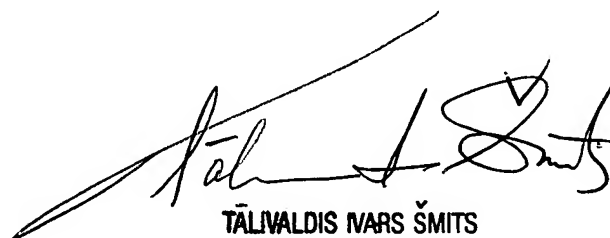
11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. **Sakamoto (JP 59064941 A1)** discloses the elimination of impulsive distortion within an input signal; **Koch (US Patent No. 5,127,053)**, **Silverman (US Patent No. 5,976,081)**, **Grabb et al. (US Patent No. 6,067,511)**, **Manjunath et al. (US 2002/0016711 A1)** and **Jax et al. (US 2003/0050786 A1)** disclose the use of RMS and ZCR values in making signal frame characteristic determinations.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin W. Rider whose telephone number is (571) 270-1068. The examiner can normally be reached on Monday - Friday 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Hudspeth can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

J.W.R.
14 September 2007



TĀLIVALDIS NARS ŠMITS
PRIMARY EXAMINER